S&P Dow Jones Indices

A Division of S&P Global

Sustainable1

The Journey to Net Zero

INTRODUCTION

The landmark Paris Agreement marked a sea change in the global fight against climate change. More than 190 countries are now committed to limiting global temperature rise and offsetting humanity's contribution to it. Unfortunately, the current pledges and policies go nowhere near enough. Achieving net zero emissions by 2050 will require far more collective power than policymakers alone can provide. However, a combination of groundbreaking new datasets and index innovation is emerging, enabling investors to play an expanded role in achieving the goals of the Paris Agreement. Cutting-edge developments in Paris alignment, physical risks, and Scope 3 emissions data and the pioneering S&P PACT™ Indices (S&P Paris-Aligned & Climate Transition Indices) provide market participants with the option to align their portfolios with a scenario that may mitigate the most catastrophic climate impacts and at the same time, embark on the journey toward a net zero economy.

A DECLARATION OF IMPORTANCE: CLIMATE RISK IS REAL, BUT PARIS ALIGNMENT DATA CAN HELP US SOLVE IT

We hold these truths to be self-evident: that the climate is rapidly warming due to human activity;[1] that if we don't act soon, we'll face certain dire consequences; and, that among these are loss of life, loss of habitat, and widespread destruction. We have a limited window to transition to a low-carbon economy and limit global temperature rise to well below 2°C (preferably 1.5°C) of warming since pre-industrial levels. Efforts are well underway thanks to the Paris Agreement and ratified commitments from at least 190 parties. Groundbreaking new datasets and index innovations are catalyzing an investor-led revolution: to reorient capital flows toward a net zero emissions trajectory by 2050.

Among these, are the S&P PACT Indices. Compliant with the EU Low Carbon Benchmark Regulation,[2] these indices equip investors with the tools to align with the Paris Agreement and achieve other climate objectives, while remaining as close as possible to the underlying benchmark, targeting broad and diversified exposure. The sophistication of methodology and depth, breadth, and robustness of the underlying S&P Global data set these indices apart.

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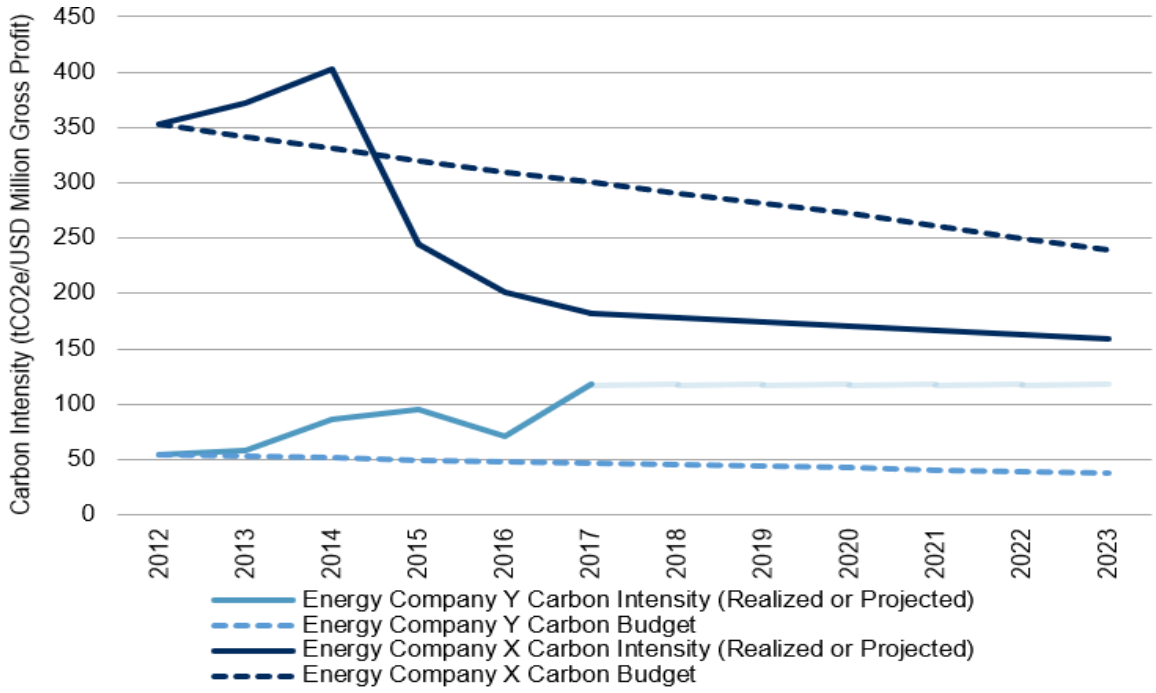
[1] Numerous publications in peer-reviewed scientific journals highlight that more than 97% of climate scientists believe the earth's climate is rapidly warming due to human activity. https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002

[2] "EU climate benchmarks and benchmarks' ESG disclosures", EU, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-climate-benchmarks-and-benchmarks-esg-disclosures_en.

Exhibit 1: Illustrative Company Greenhouse Gas (GHG) Emission Trajectories Relative to Carbon Budgets



Source: S&P Global Trucost. Chart is provided for illustrative purposes.

S&P Global Trucost's Paris Alignment Dataset is a key driver of the S&P PACT Indices Methodology, using transition pathway models to assess company-level alignment with carbon budgets. The budgets reflect a company's share of the decarbonization required to transition to net zero from its unique base-year emissions—measured by the difference in tCO_2e (tons of carbon and carbon equivalents) between a company's actual emissions' trajectory and its required pathway (see Exhibit 1). This is accomplished in one of two ways.

1. The Sectoral Decarbonization Approach (SDA)

For companies with high-emitting, homogeneous business activities, climate scenario models produced by the International Energy Agency (IEA) define sector-specific budgets in terms of units of output (e.g., tCO_2e per ton of crude steel produced). Companies in each sector must converge toward emission intensities consistent with a given scenario (1.5°C or 2°C) by 2050 from their unique starting points.[3] This method, the Sectoral Decarbonization Approach (SDA), permits sectors to decarbonize at varying speeds, depending on the available technologies and opportunities for carbon efficiencies within sectors.

2. The GHG Emissions per Unit of Value Added (GEVA) Approach

For remaining companies with low-emitting or heterogeneous business activities, without distinct pathways defined in climate scenarios, budgets are based on GEVA, via an economy-wide scenario. This approach captures company reduction requirements to be consistent with the required rates for the overall economy, given its unique starting emissions intensity, in terms of

[3] Underpinning both approaches is a solid foundation of precise and granular company carbon data from S&P Global Trucost, based on its proprietary environmentally extended input-output modeling of 464 sub-industries and verified company disclosure.

a financial, rather than physical, denominator. For example, if global emissions per unit of GDP fell by 5% each year, they would be 50% lower in 2050 than in 2010, assuming the economy continued to grow at its historical rate of 3.5%. We can thus translate this 5% year-on-year reduction to company budgets based on their individual contributions to GEVA.[4]

These approaches fuel a cutting-edge dataset that unlocks dynamic company-level insights to align portfolios with the goals of the Paris Agreement. In the S&P PACT Indices, constituents are thereby reweighted, so the entire index is 1.5°C compatible on a forward-looking basis at every rebalance.

"LET'S GET PHYSICAL" WITH PHYSICAL CLIMATE RISK DATA

The past 20 years saw a 74% worldwide increase in the number of disasters linked to natural hazards compared to the prior two decades, resulting in 1.23 million lives claimed, 4 billion people affected, and USD 2.7 trillion in estimated economic losses.[5] The link between such cataclysms and rising global temperatures due to human activity is widely established.[6] To date, the majority of climate-related financial models for capital allocation decisions have focused principally on transition-related risks rather than costly physical climate impacts. For years, the unpredictability of climate patterns, coupled with only rough estimates of asset locations, made company and investor portfolio-level assessments of physical climate risks guesswork. That is, until now.

Technological advances allow for granular assessments of physical risk exposure built upon climate scenario models, asset-level data, and geolocation specificity of assets. The need to address both physical and transition climate risk,[7] as well as the opportunities associated with climate change, is key to building resilient portfolios, as per the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) (see Exhibit 2). This is important, as transition and physical risks are not a priori connected. The failure to transition to a low-carbon economy increases the likelihood and severity of physical risks by failing to adapt to climate change, while the failure to mitigate physical risks suggests that the market is not transitioning, thus exposing more sensitivity to the rising occurrence of climate-related hazards.[8]

[4] For more information on the S&P Global Trucost Paris Alignment Dataset please go to: www.spglobal.com/spdji/en/education/article/faq-sp-paris-aligned-and-climate-transition-pact-indices.

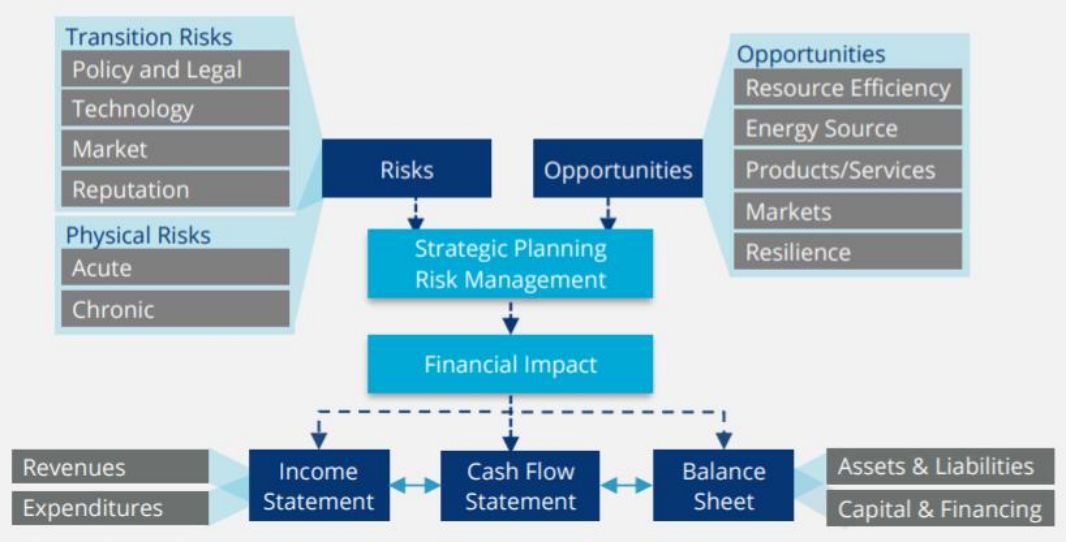
[5] "Human Costs of Disasters: An overview of the last 20 years", UN Office for Disaster Risk Reduction, www.undrr.org/media/48008/download.

[6] "On the Causal Structure between CO_2 and Global Temperature", A. Stips et al, 2016, https://www.nature.com/articles/srep21691

[7] There are two types of climate risk: transition and physical risks. The latter refers to either: i) acute physical hazards, such as more frequent and extreme weather events (storms, hurricanes, floods, etc.), or ii) the chronic and longer-term effects of climate change, such as changing weather patterns or sea level rise. Transition risks, on the other hand, refer to the costs associated with the policy, legal, technological, market, and reputational risks from adapting to climate change and transitioning to a low-carbon economy. Thus, transition risk results in expenses, such as those related to the early retirement of assets, while physical climate risk may threaten disruptions in supply chains and amount to costly insurance premiums, for example.

[8] For more information about the interplay of transition and physical climate risks, please refer to this report: www.spglobal.com/marketintelligence/en/documents/sp-trucost-interplay-of-transition-and-physical-risk-report-05a.pdf.

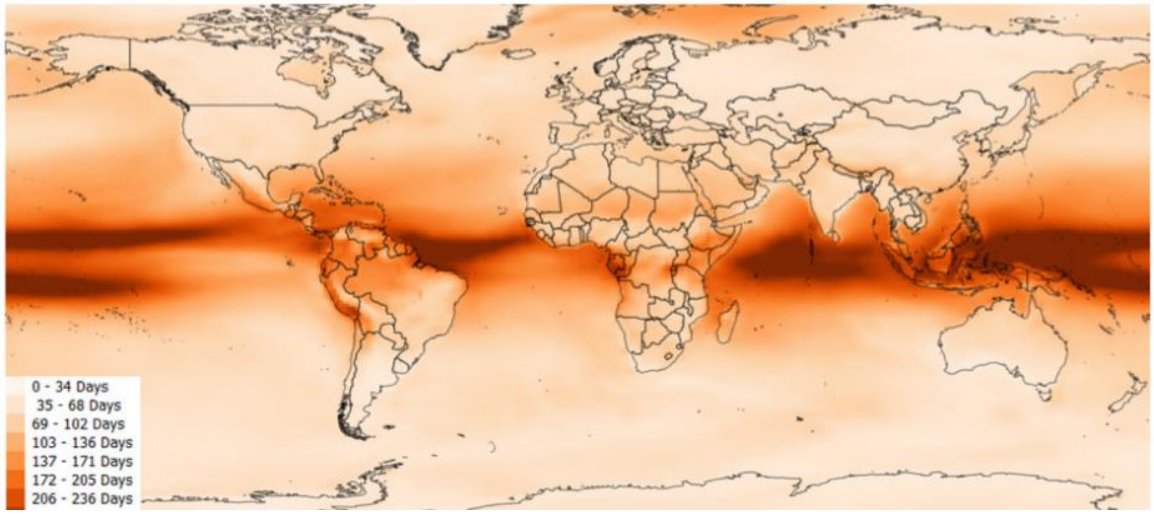
Exhibit 2: The TCFD's Approach to Climate-Related Risks, Opportunities, and Financial Impacts



Source: TCFD Final Report (2017). Chart is provided for illustrative purposes.

Unlike transition risks, which could affect companies anywhere, certain locations are more exposed to physical risks (e.g., Miami, FL condos are exposed to hurricanes). Climate hazard models must therefore be coupled with location-specific, asset-level data. With extensive data on 2.8 million asset locations[9] and expertise in mapping corporate ownership structures to parent entities, S&P Global Trucost's physical risk analytics are unparalleled in this regard. The model maps granular bottom-up exposures to forward-looking, science-based climate scenarios—over different time horizons—across seven climate hazards: floods, water stress, heatwaves, coldwaves, hurricanes, sea level rise, and wildfires (see Exhibits 3 and 4). A company's sensitivity to these risks is also determined based on company-level characteristics, such as water intensity, labor intensity, and capital intensity.[10]

Exhibit 3: Example Frequency of Heatwaves under a High Climate Change Scenario

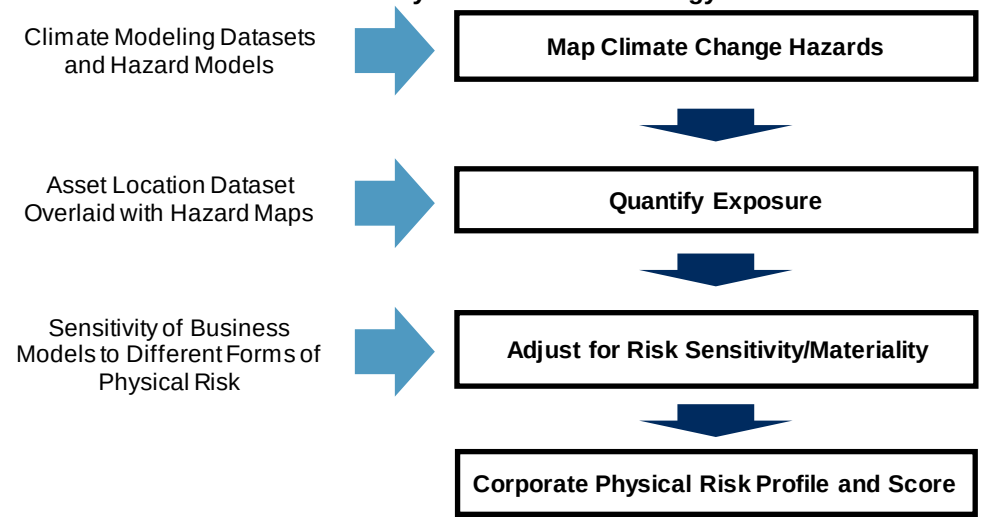


Source: S&P Global Trucost. Chart is provided for illustrative purposes.

[9] As of July 2020

[10] For more information, please refer to the methodology: www.marketplace.spglobal.com/en/datasets/trucost-physical-risk-(148).

Exhibit 4: S&P Global Trucost Physical Risk Methodology Schematic



Source: S&P Global Trucost. Chart is provided for illustrative purposes.

By combining the Physical Risk Dataset with S&P Global Trucost's Paris Alignment Dataset investors can help reduce multiple potential climate-related risks, whatever the outcome regarding our transition to a low-carbon economy. S&P DJI designed the S&P PACT Indices to help investors do just that. The index methodology incorporates both datasets, while simultaneously addressing myriad other climate objectives. At the constituent level, the index dynamically caps individual company exposure to guard against acute climate hazards (e.g., storms and floods). At the index level, it reduces the weighted-average physical risk exposure of the index overall, as this helps mitigate the long-term effects of more chronic physical impacts (e.g., sea level risk).

Together, these two datasets signify a scientific turning point in our race against climate change. Investors now have tools to align with a scenario that may mitigate the most catastrophic impacts, build portfolio resilience and, ultimately, achieve our goal of obtaining net zero emissions by 2050.

IT'S ALL WITHIN SCOPE, WITH S&P GLOBAL SCOPE 3 DATA

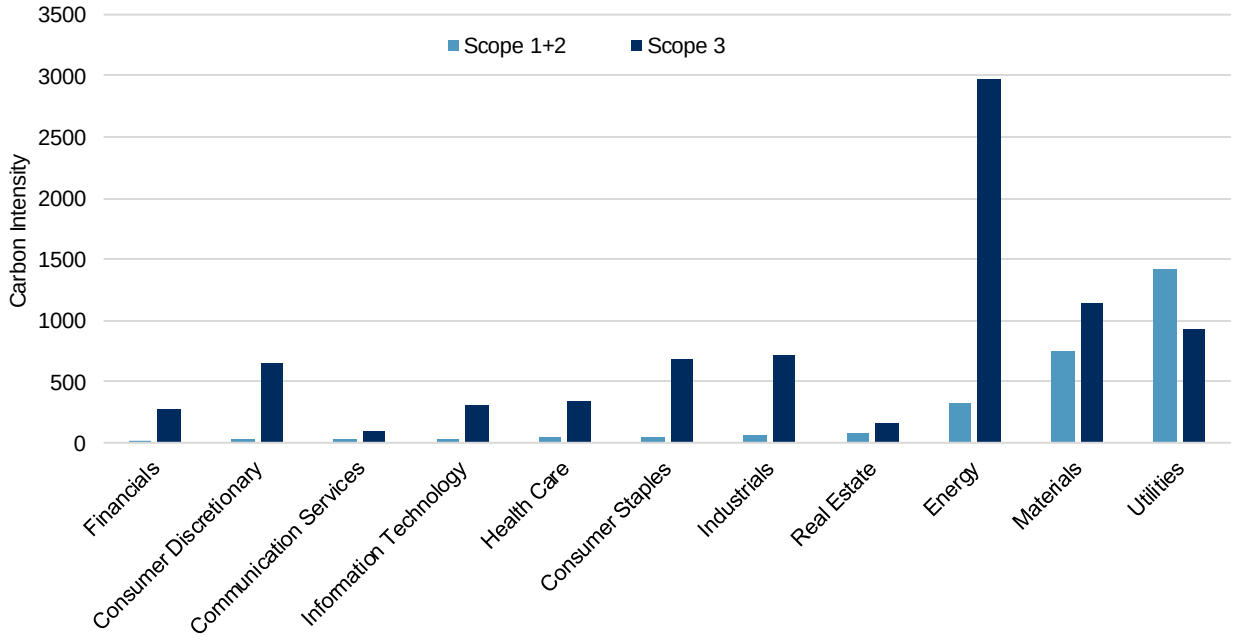
Climate change is high on the agenda, prompting one-fifth (21%) of the world's 2,000 largest publicly listed companies to pledge net zero commitments by 2050.[11] However, only one-third of these are believed to include Scope 3 emissions, defined by the Greenhouse Gas Protocol as including all indirect emissions that occur in the company's value chain.[12] The greatest share of GHG emissions comes from Scope 3 sources, culpable for as much as 90% among certain companies.[13] Omitting areas of the value chain invites greenwashing and could expose us to a mispricing of assets (never mind the climate impacts).

[11] "TAKING STOCK: A global assessment of net zero targets", University of Oxford, March 2021, https://racetozero.unfccc.int/wp-content/uploads/2021/06/ECIU-Oxford_Taking_Stock.pdf.

[12] Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Standard: https://ghgprotocol.org/standards/scope-3-standard

[13] "Scope 3 and the supply chain: How businesses are taking sustainability leadership to a new frontier", Edie, August 5, 2020, www.edie.net/library/Supply-chain-emissions--The-next-frontier-of-sustainable-business-leadership/6982.

Exhibit 5: Sector Breakdown of Scope 1+2 and Scope 3 Emissions



Source: S&P Global. Data as of December 2020. Chart is provided for illustrative purposes.

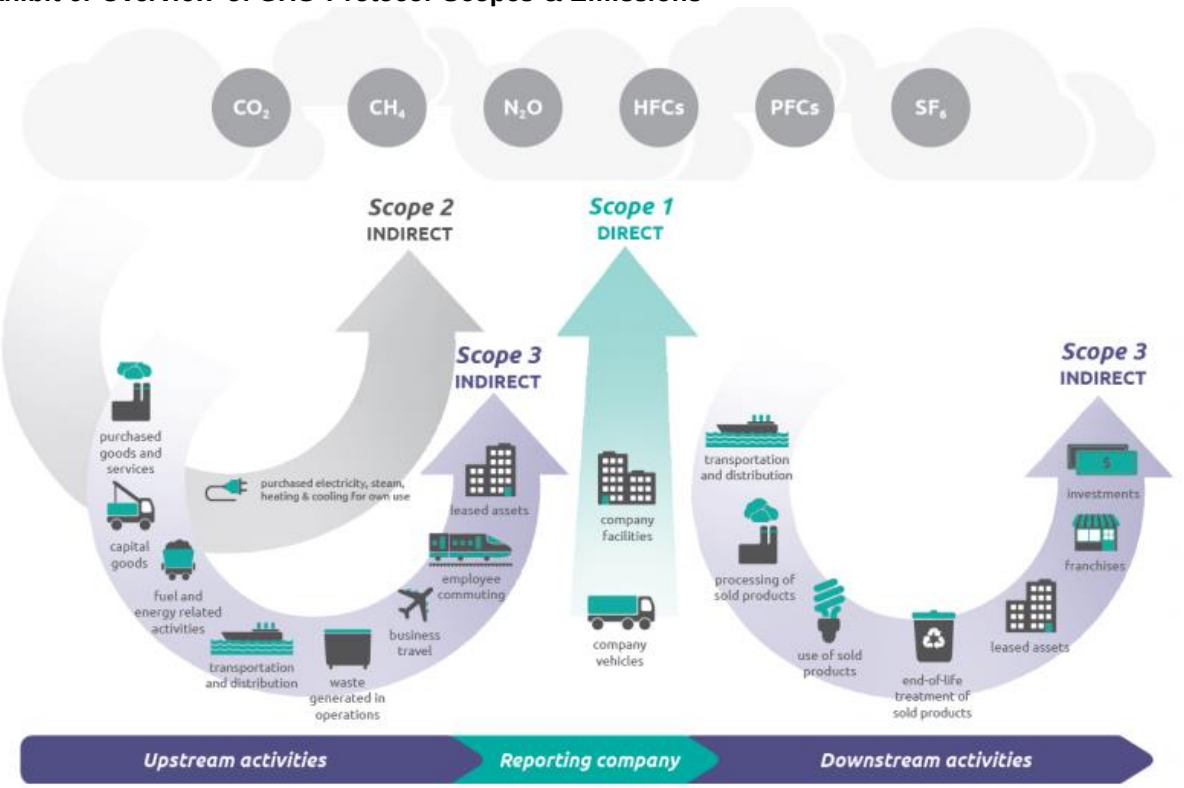
What is Scope 3 data and how can it be measured? The GHG Protocol classifies a company's GHG emissions into three scopes. Scope 1 refers to direct emissions from owned or controlled sources (i.e., emissions from day-to-day company operations). Scope 2 refers to indirect emissions from purchased energy (i.e., emissions to support a company's electricity consumption). Scope 3 emissions are indirect emissions, not included in Scope 2, embedded throughout a company's value chain. These can be upstream, such as the indirect emissions fueled by a company's supply chain, or downstream, via the emissions generated by the use of a company's products and services.[14] All scopes are key to measuring a company's overall footprint and, in some cases, Scope 3 may matter more, as its share of emissions is not the same across sectors.

What about the issues of double counting caused by incorporating Scope 3 emissions? The EU Technical Expert Group on Sustainable Finance does not recommend any management of double counting, since the emissions may be considered as a proxy, even if imperfect, for climate change-related financial risks. The risk reduction objective of investors using climate benchmarks also supports a basis for not managing double counting.[15]

[14] To learn more about the GHG Protocol's approach to classifying emissions scopes, refer to: https://ghgprotocol.org/sites/default/files/standards_supporting/FAQ.pdf).

[15] "Report on Benchmarks", EU Technical Expert Group on Sustainable Finance, September 2019, https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/190930-sustainable-finance-teg-final-report-climate-benchmarks-and-disclosures_en.pdf.

Exhibit 6: Overview of GHG Protocol Scopes & Emissions



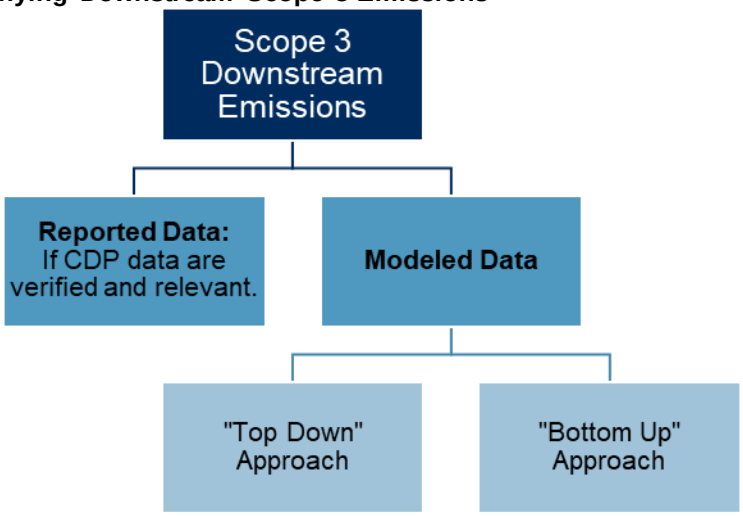
Source: GHG Protocol: Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Standard. Chart is provided for illustrative purposes.

Our approach rests upon S&P Global Trucost's leading methodology for quantifying the environmental impacts of companies' business activities, using S&P Global Trucost's proprietary Environmentally-Extended Input Output (EEIO) model. This extends traditional economic input-output modeling (defining the ratio of expenditure from one sector across all sectors) to account for the known environmental impacts associated with given units of production (e.g., tCO_2e per metric ton of crude steel).

We apply this at hyper-granular levels of segmentation, breaking down global economic activity to 464 sub-industries as detailed as paper versus cardboard manufacturing. If companies do not disclose their environmental footprint, we can estimate their Scope 1, Scope 2, and Scope 3 emissions by overlaying environmental-intensity factors on a company's known quantities of production and weighting these by revenue source for companies with diversified business models. We apply this across a company's operations and across their entire supply chain, including primary resource extraction, secondary processing, and final product assembly, to cover all upstream Scope 3 categories from cradle to gate. For downstream impacts, our approach utilizes CDP's collected data, for which respondents can provide emissions for: downstream transportation and distribution, processing of sold products, use of sold products, end-of-life treatment of sold products, downstream leased assets, franchises, investments, and any other applications the company might deem applicable.[16]

[16] S&P Global Trucost considers all 15 of the upstream and downstream categories outlined by the GHG Protocol Corporate Value Chain Accounting Standard, to align with industry best practices.

Exhibit 7: Quantifying Downstream Scope 3 Emissions



Source: S&P Global Trucost. Chart is provided for illustrative purposes.

A company's reported data is used without adjustment if and only if it is third-party verified and all relevant categories are calculated.[17] Where there are data gaps, the model also serves as a stopgap to ensure universal coverage. This is essential for index construction to align with a net zero pathway within our S&P PACT Indices. As with any investment strategy, the results are only as good as the quality of the underlying inputs. Thus, in a world where greenwashing runs rampant and time is of the essence, such scientific bases for capturing all manner of emissions—from Scope 1 to 3—remain indispensable in our fight against climate change.[18]

This is a summary of articles that originally appeared in The Quality Imperative, by S&P Global Sustainable1:

A Declaration of Importance: Climate Risk is Real, But Paris Aligned Data Can Help Us Solve It

Let's Get Physical with S&P Trucost's Physical Climate Risk Data

It's All Within Scope, With S&P Global Scope 3 Data

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[17] S&P Global Trucost also engages annually with all the 14,000+ companies being covered (capturing 99% of global market capitalization) for additional verification, giving companies the opportunity to dispute any discrepancies, assuming they substantiate their claims with third-party verified documentation.

[18] For more information on the S&P Global Trucost Methodology for Assessing Scope 3 Emissions Data, please refer to our methodology document available here: www.marketplace.spglobal.com/en/datasets/trucost-environmental-(46).

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